**DATE:** April 24, 2020

**TO:** Jason Pause, Electric Distribution Systems,
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Department of Public Service
3 Empire State Plaza, Albany, NY 12223

**FROM:** Joint Utilities of New York – Interconnection Technical Working Group (ITWG)

**RE:** 2/27/2020 ITWG Industry Response - Auxiliary Metering for ESS Projects

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Pursuant to your request, here is the (DRAFT) response from the Joint Utilities of New York ("JU") regarding the Industry Response to the discussion of auxiliary metering requirements at the February 6, ITWG meeting. Included herein are the technical positions and descriptions supporting the JU auxiliary metering requirements. It is worth noting that the response also corrects a number of points made in the Industry Response that are either mischaracterized or incorrect. The response reflects the position of all of the utilities identified on this letterhead.

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**Introduction**

The JU would like to reiterate that the discussion herein, regarding auxiliary metering requirements, should remain focused on the technical merits of the proposed positions and concerns raised. The response below aims to provide the additional technical summary to help better contextualize the current auxiliary metering requirements. There are specific points of discussions highlighted herein, that have been raised in the Industry Response, that the JU wish to correct and provide greater clarification as part of that response.

One of the primary concerns raised in the Industry Response is the perceived unfair treatment of metering requirements for ESS compared to that of commercial customers. The JU position is that the Industry Response inaccurately compare metering practices of commercial loads with ESS interconnections. In terms of tariffs, the JU recommends each tariff be compared side by side to note the differences so we can have a relative basis for comparison. The technical concerns are discussed in greater detail below.

**Typical Metering Practices**

From a metering perspective, the problem in using a single metering point to measure both load and generation is the limited accuracy range of current transformers and the measurement sensitivity of modern solid state meters. It is true, that in metering commercial loads without the presence of generation, there's a point in which the minimum load will exceed the current transformer's (CT) low-end accuracy limit. Measurement inaccuracies resulting from this measurement constraint of the CT's are typically waived and lumped into "system losses".

ESS loads however are different from conventional commercial loads in the sense that the consequence of an inaccurate measurement at the low end of the CT's measurement range is not just a minor insignificant error that can be lumped into overall system losses. This measurement inaccuracy can have greater financial implications. Unlike ESS, commercial loads would typically be estimated against an single coincident demand (diversity) factor for the customer type. Generation facilities under 5MW by contrast, have multiple defined factors for import charge, export discharge, load demand each can significantly diverge and become a problematic for metering CTs at the top range of the SIR limit. For ESS, the problem is further exacerbated as the active min/max auxiliary load carries a higher burden, due to the necessary HVAC requirements to help maintain the efficiency and life of the battery cells.

On several ESS projects, a metering authority was expected to measure kW demand of the ESS facility's loads without the presence of generation. For a single metering point scenario, the CT's must be sized to accommodate the maximum generation. Therefore, by default, this sizing of the CT's for maximum generation establishes a low-end measurement limit of the CT's. The kW measurement of the facility's load when the facility is not generating is far below the CT's measurement accuracy limit at the low-end. The CT error at the low current end is biased in favor of the ESS facility. The CT error at low currents results in the under registration of usage.

As an example, when the maximum generation is 2 MVA + and the load without generation is 5 kVA (significantly below the CT's measurement capability), the input to the meter from the CT's, which is operating far below its measurement accuracy limit, cannot be expected to measure the difference between say 5 kW and 6 kW demand. Under certain NY utility tariffs, 5 kW demand or less is the limit which some of the ESS facilities needed to meet to qualify for more favorable financial rate, both for receiving service and for selling their generation. A measured kW demand higher than 5 kW would push the ESS facility from an energy only rate to a kW demand rate and the ESS facility would lose their financial benefit and would be forced to sell their excess generation under less favorable conditions.

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Furthermore, initial design load projections for new businesses are based on commercial customers max and diversified loads when in operation. Sizing of utility equipment for the installation is based on these loads. Customer metered usage when in operation would be within the approved spectrum of the transformer accuracy. The difference here is the new PV installations min/max loads are known to be outside the accuracy spectrum from the outset and would not be approved due to this constraint. Hence if there is not a viable solution to the metering accuracy as requested from the design phase, the utility must require a secondary service to accurately meter.

**Current Transformer Accuracy Ranges**

CT accuracy ranges came into greater focus as a result of an ongoing project-level design dispute. The Industry Response document does not correctly portray IEEE C57.13 (Standard Requirements for Instrument Transformers) as part of their position. The primary metering example cited as part of their position focuses on 0.3 class CTs. The supporting text in the Industry Response on 0.3 class CTs is not clearly communicated relative to IEEE C57.13.

[redacted]

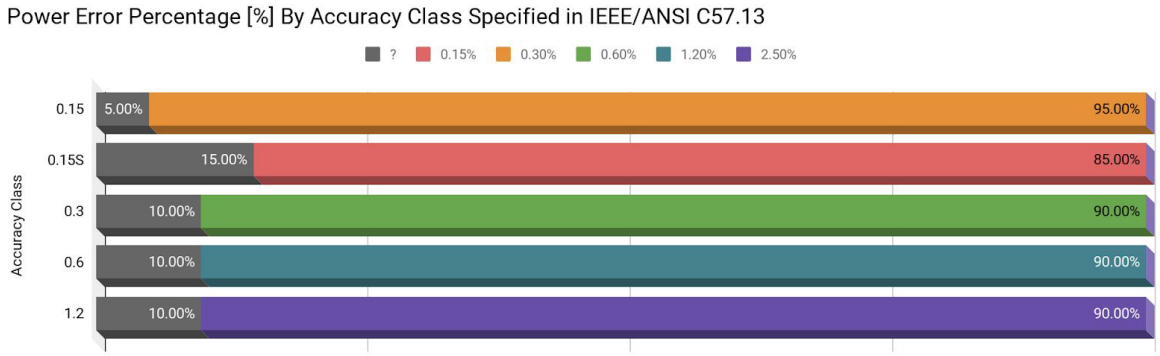


*Figure 1: Visualization of Current Transformer Accuracy Ranges per Industry Response*

Regarding Figure 1, the Industry Response states:

"*What is shown clearly in this graph is that all metering CT's have a limit below which their accuracy rating is not certified which is 10% of rated current for the 0.3 accuracy class. As an example, for a project using a 0.3 class CT for metering with a peak output or load of X, any generation or load operating below 10% of this peak will not be metered with revenue-grade accuracy.*"

The latter half can be better stated as:

*"As an example, for a project being metered with a 0.3 class CT, any generation or load operating below 10% of the CT's rating factor will not be metered with revenue-grade accuracy. Based on IEEE C57.13:*

- *For a standard 0.3 class CT any measurement from 10% to 100% of the rating factor will be accurate to 0.6%*
- *For a standard 0.3 class CT any measurement from 100% to 400% of the rating factor will be accurate to 0.3%*

- *For a standard 0.3 class CT any measurement from 0% to 10% and over 400% is undefined & inaccurate"*

The JU submit the following figures for additional context as part of this discussion[1].

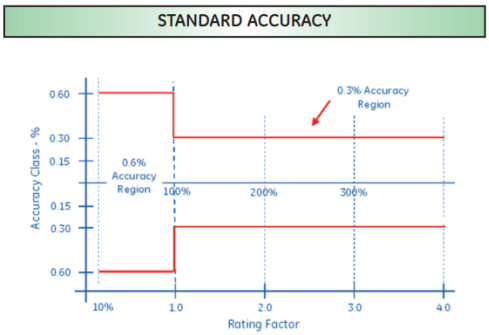


**Table 4**
**IEEE Metering Accuracy Classes for Current Transformers**

| Accuracy Class | Limits of Ratio Correction Factor and Transformer Correction Factor | | | | Limits of Power Factor (Lagging) of Metered Power Load |
|---|---|---|---|---|---|
| | 100% Rated Current* | | 10% Rated Current | | |
| | Minimum | Maximum | Minimum | Maximum | |
| 0.3 | 0.997 | 1.003 | 0.994 | 1.006 | 0.6-1.0 |
| 0.6 | 0.994 | 1.006 | 0.988 | 1.012 | 0.6-1.0 |
| 1.2 | 0.988 | 1.012 | 0.976 | 1.024 | 0.6-1.0 |

* These limits also apply at the maximum continuous-thermal current, which is the product of rated current and the continuous-thermal-current rating factor.

**Application of Demand Charges**

The Industry Response draws a false equivalency between the full scope of how commercial customers and ESS are metered. They specifically cite that the JU are inconsistent with the DPS Metering Requirements. It should be clarified that Department of Public Service 16 NYCRR Part 92 Operating Manual March 14, 2003, (https://www.dps.ny.gov/Part92-Operating-Manual.pdf), is specific to load and the discussion herein focuses on auxiliary metering requirements, where both load and generation exist. The examples put forth by the Industry are not an appropriate comparison.

Both load and generation need to be accurately metered. Per GE Solutions Spec. – **No Accuracy guaranteed at current levels less than** 10% for standard accuracy CTs, 1% for RevenueSense and Extended Range (JCK-5CER), and 4% for Encompass. Per NYSEMEC Guide for Uniform Practices in Revenue Quality Metering:

- 3.1 All CT's should conform to the ANSI standard accuracy class for metering service of 0.3 or better and shall be provided with certificates of test stipulating the ratio and phase angle corrections at 10% and 100% of rating with the standard ANSI burden nearest to the actual "in-service" burden.

However, the major disconnect in comparing a load customer to an ESS+PV system (particularly where the ESS is purely charged from the PV and the system is standalone) is the rates the customer is charged.

Demand charges are not similarly applied to ESS as they are with large commercial customers, as they would create a less favorable economic environment for deploying ESS. This is more of a discussion of the application of tariffs across different customers. This starts to get into questions cost shifting and how the cost is socialized across the entire customer base. This is not a discussion under the scope of the ITWG and should be moved in the appropriate forum.

[1] Electrical Utilities Reference Guide for Instrument Transformers. General Electric. Pages 101 & 103, (2016, April 12). Retrieved from https://www.gegridsolutions.com/ITI/specs/resources.htm.

**Metering Cost Transparency**

The metering costs as cited in the Industry Response document (e.g. $16,000, $56,000, $76,000) are not properly contextualized and can be interpreted as artificially high. It is unclear if the metering costs described are for primary or secondary metering.

**Permitting**

While the Industry Response raises concerns with the permitting process, it is the JU's understanding that the existing hurdles with overcoming the local permitting process are mostly driven by specific town's approval processes, and not as a result of utility requirements.

**Existing Metering Practices for Power Plants with Large Auxiliary Loads**

The JU's proposed solution to separately meter auxiliary loads is currently in line with practices for existing power plants with large auxiliary loads. These systems are currently configured in the following manner:

- Auxiliary loads are tapped of the generation station bus when generating
- When not generating or offline, the auxiliary loads transition to a separately metered service provided by the local utility

**Conclusion**

The JU has determined that auxiliary loads associated with energy storage systems will, for a significant amount of the time, be below the current transformer threshold for accurate metering established by the New York State Public Service Commission. The JU has established that the inaccurately metered loads would appear as system losses, and no rate has yet been identified to compensate for these system losses. The discussion within the ITWG should remain focused on the technical merits of the auxiliary metering requirements. This includes questions related to metering accuracy, why ESS are studied differently than commercial loads and any others that are technical in scope. The JU position is that discussions regarding how metering requirements and tariffs are applied relative to commercial customers and ESS should be had in the appropriate forum. Our intent is that this response helps provide greater clarity and accuracy to the technical merits of auxiliary metering requirements, so the appropriate forum that takes up this discussion next is adequately informed on the differences between positions.

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